

DERWENT-ACC-NO: 1992-403751
DERWENT-WEEK: 200046
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TITLE: Control rod for nuclear reactor - comprises control rod blades extending radially from central structure

PATENT-ASSIGNEE: TOSHIBA KK[TOKE]

PRIORITY-DATA: 1991JP-0066620 (March 29, 1991)

PATENT-FAMILY:

PUB-NO MAIN-IPC	PUB-DATE	LANGUAGE	PAGES
JP 3086709 B2 007/113	September 11, 2000	N/A	011 G21C
JP 04301596 A 007/113	October 26, 1992	N/A	011 G21C

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 3086709B2 1991	N/A	1991JP-0066620	March 29,
JP 3086709B2	Previous Publ.	JP 4301596	N/A
JP 04301596A 1991	N/A	1991JP-0066620	March 29,

INT-CL_(IPC): G21C003/30; G21C003/334 ; G21C005/00 ; G21C007/113

ABSTRACTED-PUB-NO: JP 04301596A

BASIC-ABSTRACT: Control rod comprises control rod blades extending radially from a central structural member, the width of the blade being larger than the width of one side of a square channel box contg. 8x8 fuel rods.

USE - For nuclear power plants.

CHOSEN-DRAWING: Dwg.1/17

TITLE-TERMS:

CONTROL ROD NUCLEAR REACTOR COMPRISE CONTROL ROD BLADE EXTEND RADIAL CENTRAL STRUCTURE

DERWENT-CLASS: K05 X14

CPI-CODES: K05-B06A;

EPI-CODES: X14-C01;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-179454

Non-CPI Secondary Accession Numbers: N1992-307692

CLIPPEDIMAGE= JP404301596A
PUB-NO: JP404301596A
DOCUMENT-IDENTIFIER: JP 04301596 A
TITLE: NUCLEAR REACTOR CONTROL ROD, FUEL ASSEMBLY AND NUCLEAR REACTOR CORE
PUBN-DATE: October 26, 1992

INVENTOR-INFORMATION:

NAME

SAKURAI, SHUNGO

HIRAIWA, KOJI

INT-CL_(IPC): G21C007/113; G21C003/30 ; G21C005/00

ABSTRACT:

PURPOSE: To obtain a structure of large sized fuel assembly and a core arrangement with which the number of control rods can be reduced and control rod operation does not cause any thermally severe condition.

CONSTITUTION: A cross shaped control rod of which width A on the side of cross shaped control rod blade 1a, is longer than width B on the side of rectangularly cylindrical channel box 23 of a fuel assembly 10a, is constituted. A reactor core which is arranged so that an infinitive multiplication factor of fuel assemblies of which length on the side adjacent to the control rod, is longer than twice of thermal neutron diffusion distance L, may be lower than an infinitive multiplication factor of fuel assemblies which are not adjacent to the control rod, is also constituted. Moreover, by making partial assemblies of which a side is longer than twice of the L, to be one unit, by arranging the units in M rows and M columns (where M is an integer

lager than 2) square grid shape and by housing the units into a rectangularly cylindrical channel box, a large sized fuel assembly is constituted. Furthermore, a reactor core that is arranged so that an infinitive multiplication factor of fuel assemblies of which a side is located at the outermost circle of the reactor core, is longer than twice of the L, may be lower than an infinitive multiplication factor of fuel assemblies of which a side is not located at the outermost circle of the reactor core, is constituted.

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DID:

JP 04301596 A

DERWENT-ACC-NO: 1994-202904
DERWENT-WEEK: 199425
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TITLE: Control rod for boiling water nuclear reactor - has control rod sheaths connected to central structural member to form cross-shaped transverse section, with water displacement space for filling inert gas formed inside each sheath

PATENT-ASSIGNEE: TOSHIBA KK[TOKE]

PRIORITY-DATA: 1991JP-0064969 (March 28, 1991)

PATENT-FAMILY:

PUB-NO MAIN-IPC	PUB-DATE	LANGUAGE	PAGES
JP 06138275 A 007/113	May 20, 1994	N/A	008 G21C

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP06138275A 1991	N/A	1991JP-0064969	March 28,

INT-CL_(IPC): G21C005/00; G21C007/113 ; G21C007/27

ABSTRACTED-PUB-NO: JP06138275A

BASIC-ABSTRACT: In a control rod (20) for a nuclear reactor, control rod sheaths (22) are connected to a central structural member (21) to form a cross-shaped transverse section, and a water-displacement space (23) for filling an inert gas is formed inside each sheath to constitute a spectral shift control rod for displacing water, and the reactivity value of this spectral shift control rod at the time of a low temp. is determined to be less than that at the time of power operation.

USE/ADVANTAGE - Used for a boiling water reactor. When the control rod is inserted into the core, moderator is displaced and the volume ratio of the moderator to fuel is changed, so that the reactivity characteristics such as the reactor shutdown margin and the void coefft. are improved.

CHOSEN-DRAWING: Dwg.1/8

TITLE-TERMS:

CONTROL ROD BOILING WATER NUCLEAR REACTOR CONTROL ROD SHEATH CONNECT CENTRAL STRUCTURE MEMBER FORM CROSS SHAPE TRANSVERSE SECTION WATER DISPLACEMENT SPACE FILL INERT GAS FORMING SHEATH

DERWENT-CLASS: K05 X14

CPI-CODES: K05-B06A;

EPI-CODES: X14-C01;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1994-092537
Non-CPI Secondary Accession Numbers: N1994-159593

CLIPPEDIMAGE= JP406138275A
PUB-NO: JP406138275A
DOCUMENT-IDENTIFIER: JP 06138275 A
TITLE: CONTROL ROD FOR USE IN REACTOR, REACTOR CORE STRUCTURE AND OPERATING METHOD THEREOF
PUBN-DATE: May 20, 1994
INVENTOR-INFORMATION:
NAME
HIRAIWA, KOJI
INT-CL_(IPC): G21C007/113; G21C007/27 ; G21C005/00

US-CL-CURRENT: 376/209

ABSTRACT:

PURPOSE: To provide a control rod for use in a reactor, a core structure, and an operating method thereof, the reactivity characteristic of the core of the reactor being improved by exclusion of moderators by use of spectral shift control rods and by adjustment of the moderator fuel volume ratio.

CONSTITUTION: A spectral shift control rod 20 comprises a control rod sheath 22 connected to a central structural material 21 to form a cruciform cross section, with an inert-gas sealing water exclusion space 23 formed inside the control rod sheath 22. The reactivity value of the spectral shift control rod 20 at a low temperatures is set lower than that at output operation. Therefore, the moderating fuel volume ratio can be reduced by insertion of the control rod 20 into the core of the reactor.

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DID:
JP 06138275 A

CLIPPEDIMAGE= JP406174874A
PUB-NO: JP406174874A
DOCUMENT-IDENTIFIER: JP 06174874 A
TITLE: FUEL ASSEMBLY AND REACTOR CORE
PUBN-DATE: June 24, 1994

INVENTOR-INFORMATION:

NAME

MASUMI, RIYOUJI

AOYAMA, TADAO

KOYAMA, JUNICHI

ISHIBASHI, YOKO

MOCHIDA, TAKAAKI

SONEDA, HIDEO

INT-CL_(IPC): G21C003/328; G21C003/326 ; G21C005/00

US-CL-CURRENT: 376/434

ABSTRACT:

PURPOSE: To provide a fuel assembly which can be enlarged and a reactor core using it by securing thermal tolerance and reactor stop tolerance.

CONSTITUTION: The center-to-center distance X between adjacent fuel assemblies 10, 10 is approximately equal to 23cm which is about 1.5 times as large as usual. The thickness of a gap water area is about 16mm, which is the same as usual, so the gap water area is thinned in relation to the distance X. The H/U ratio is about 5, which is the same as usual, and a decrease in unboiled water present in the gap water area is offset by water rods disposed inside a channel

box. The ratio of the sectional area of the inside of each water rod to that of a fuel pellet is approximately equal to 0.6 and then the value of a local power range peaking factor can be reduced and thermal tolerance be increased. The sectional area of each water rod 4 is 15cm² and then excess reactivity is reduced so that reactor stop tolerance can be secured.

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DID:

JP 06174874 A

CLIPPEDIMAGE= JP404122889A
PUB-NO: JP404122889A
DOCUMENT-IDENTIFIER: JP 04122889 A

TITLE: NUCLEAR REACTOR CORE, FUEL ASSEMBLY AND LOADING OF FUEL WITHIN NUCLEAR REACTOR

PUBN-DATE: April 23, 1992

INVENTOR-INFORMATION:

NAME

YAMASHITA, JUNICHI

MOCHIDA, TAKAAKI

SONEDA, HIDEO

INT-CL (IPC): G21C005/00; G21C003/328 ; G21C005/00

ABSTRACT:

PURPOSE: To provide a nuclear reactor core which accomplishes the control of a degree of reaction and an output distribution accurately by arranging square grids inside a reactor core while rectangular grids outside the reactor core.

CONSTITUTION: A nuclear reactor core is made up of a plurality of core grids sectioned conceptionally by spaces for inserting control rods. The core grids are made up of a plurality of square grids 10 and rectangular grids 11 the same

in number as those 10 preferably. The above square grids 10 and the rectangular grids 11 are formed with one side of the rectangular grid 11 in

the length L when the length of the square grid is L while the other side of the rectangular grid 11 is formed in the length $L+\alpha$, larger than the length L

of the square grid 10. The square grid 10 is arranged inside the core while the rectangular grid 11 outside the core.

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TTL:

NUCLEAR REACTOR CORE, FUEL ASSEMBLY AND LOADING OF FUEL WITHIN NUCLEAR REACTOR

INZZ:

YAMASHITA, JUNICHI

FPAR:

PURPOSE: To provide a nuclear reactor core which accomplishes the control of a degree of reaction and an output distribution accurately by arranging square grids inside a reactor core while rectangular grids outside the reactor core.

FPAR:

CONSTITUTION: A nuclear reactor core is made up of a plurality of core grids sectioned conceptionally by spaces for inserting control rods. The core grids are made up of a plurality of square grids 10 and rectangular grids 11 the same

in number as those 10 preferably. The above square grids 10 and the rectangular grids 11 are formed with one side of the rectangular grid 11 in

the length L when the length of the square grid is L while the other side of the rectangular grid 11 is formed in the length $L+\alpha$, larger than the length L

of the square grid 10. The square grid 10 is arranged inside the core while the rectangular grid 11 outside the core.

CLIPPEDIMAGE= JP404296693A

PUB-NO: JP404296693A

DOCUMENT-IDENTIFIER: JP 04296693 A

TITLE: CORE OF REACTOR

PUBN-DATE: October 21, 1992

INVENTOR-INFORMATION:

NAME

KUSUNO, SADAO

INT-CL (IPC): G21C003/328

ABSTRACT:

PURPOSE: To obtain the core of a reactor which keeps the core characteristics of the reactor excellent even the nature of the fuel loaded varies in a wide range by making a fuel assembly in large-size and reducing the CRD to be replaced with the reactivity control capacity increased.

CONSTITUTION: The core of a reactor is made of a sub fuel area 9 comprising an $N \times N$ square grid arrangement, in which the number of arrangement of fuel rods 2 of one side of a cross section of the core divided into three (I, J and K) arrangement and the $N \times N$ square grid divided into an $I \times I$, $J \times J$ and $K \times K$ square and two $I \times J$, $I \times K$ and $J \times K$ squares, i.e., nine sub-grids. Fuel assemblies 1 comprising the sub fuel area divided into pieces and reinforced by structure material are regularly arranged

so that water passages 6 filled with reactor water of a # shape may be formed, and two cross controlling rods 7 are arranged on each fuel assembly excluding the periphery of the reactor core.

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DID:

JP 04296693 A

DERWENT-ACC-NO: 1992-401456
DERWENT-WEEK: 199249
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TITLE: Boiling water nuclear reactor core - has square rod bundle divided into sub-fuel regions sep'd. by water passages

PATENT-ASSIGNEE: TOSHIBA KK[TOKE]

PRIORITY-DATA: 1991JP-0061895 (March 26, 1991)

PATENT-FAMILY:

PUB-NO MAIN-IPC	PUB-DATE	LANGUAGE	PAGES
JP 04296693 A 003/328	October 21, 1992	N/A	010 G21C

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP04296693A 1991	N/A	1991JP-0061895	March 26,

INT-CL_(IPC): G21C003/328

ABSTRACTED-PUB-NO: JP04296693A

BASIC-ABSTRACT: The fuel rods are arranged in a square-pattern NxN rod bundle, the NxN rod bundle is divided into nine sub-fuel regions, and respective sub-fuel regions are separated by parallel-cross water passages filled with coolant. Two cross-shaped control rods are arranged for each fuel assembly.

USE/ADVANTAGE - Used for a boiling water reactor. The fuel assembly is enlarged, and the number of control-rod-drives can be reduced while increasing the reactivity control capacity. Even if the character of fuel varies, the core characteristic of the reactor can be maintained.

CHOSEN-DRAWING: Dwg.1/22

TITLE-TERMS:

BOILING WATER NUCLEAR REACTOR CORE SQUARE ROD BUNDLE DIVIDE SUB FUEL REGION
SEPARATE WATER PASSAGE

DERWENT-CLASS: K05 X14

CPI-CODES: K05-B04B;

EPI-CODES: X14-B04X;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-177972

Non-CPI Secondary Accession Numbers: N1992-306068

WEST**End of Result Set****Generate Collection**

L1: Entry 1 of 1

File: DWPI

Mar 20, 2001

DERWENT-ACC-NO: 1998-604310

DERWENT-WEEK: 200118

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TITLE: Core structure for boiling water reactor used in
electricity generation - has stub plane control rods with length
equal to fuel assembly width arranged in centre of channel box

INVENTOR: AOYAMA, M; CHAKI, M ; HAIKAWA, K ; KONDO, T ; MASUHARA,
Y ; MORIYA, K ; TAKII, T ; YAMANAKA, A ; YAMASHITA, J

PATENT-ASSIGNEE:

ASSIGNEE	CODE
HITACHI LTD	HITA

PRIORITY-DATA: 1997JP-0079555 (March 31, 1997)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
US <u>6205196</u> B1	March 20, 2001		000	G21C003/34
JP 10274687 A	October 13, 1998		007	G21C005/00
CN 1197275 A	October 28, 1998		000	G21C003/30

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
US 6205196B1	March 27, 1998	1998US-0048994	
JP 10274687A	March 31, 1997	1997JP-0079555	
CN 1197275A	March 31, 1998	1998CN-0106110	

INT-CL (IPC): G21C 3/30; G21C 3/32; G21C 3/34; G21C 5/00; G21C
7/00; G21C 7/08; G21C 7/113

ABSTRACTED-PUB-NO: JP 10274687A

BASIC-ABSTRACT:

The structure includes several channel boxes (1) which surround several fuel assemblies (2), individually. Several control rods (4) with four wings (3) are arranged between the channel box. Several long winged control rods (6) are arranged with the wings extending in four diagonal directions and between the channel boxes, in the right direction of grouping the channel boxes. A stub plane control rod (7) is provided in the centre of the

channel box. The length of wings of the stub plane control rods are equal to the width of the fuel assemblies contained in the channel box.

ADVANTAGE - Avoids reduction in control rod performance. Achieves reduction in number of threads of control rod. Enables simplification and rationalisation of control system.

ABSTRACTED-PUB-NO:

US 6205196B

EQUIVALENT-ABSTRACTS:

The structure includes several channel boxes (1) which surround several fuel assemblies (2), individually. Several control rods (4) with four wings (3) are arranged between the channel box. Several long winged control rods (6) are arranged with the wings extending in four diagonal directions and between the channel boxes, in the right direction of grouping the channel boxes. A stub plane control rod (7) is provided in the centre of the channel box. The length of wings of the stub plane control rods are equal to the width of the fuel assemblies contained in the channel box.

ADVANTAGE - Avoids reduction in control rod performance. Achieves reduction in number of threads of control rod. Enables simplification and rationalisation of control system.

CHOSEN-DRAWING: Dwg.1/11

TITLE-TERMS: CORE STRUCTURE BOILING WATER REACTOR ELECTRIC GENERATE STUB PLANE CONTROL ROD LENGTH EQUAL FUEL ASSEMBLE WIDTH ARRANGE CENTRE CHANNEL BOX

DERWENT-CLASS: K05

CPI-CODES: K05-B01;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1998-181122